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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,444	07/29/2003	Kenichi Koyanagi	P/3236-39	7918

2352 7590 04/11/2006

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EXAMINER	
COLEMAN, WILLIAM D	
ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 04/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/630,444	KOYANAGI ET AL.
	Examiner	Art Unit
	W. David Coleman	2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

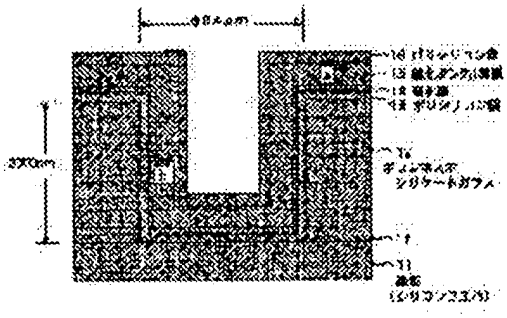
Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-17, 19-35 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuyama et al., U.S. Patent 6,753,618 B2.

Matsuyama discloses a semiconductor process as claimed. See **Drawings. 1-6** where Matsuyama teaches the claimed invention.



3. Pertaining to claim 1, Matsuyama teaches a method for manufacturing a semiconductor device, comprising a dual-stage deposition step comprising:

a first stage for introducing a material gas containing

desired metal (i.e., tantalum pentaethoxy) into a reaction chamber in which a semiconductor substrate on a surface of which a metal film is formed in part

or in entirety is placed to thus form an oxide film made of said

specified metal by a vapor-phase growth method and, after completion of the first stage, the following

second stage for removing from said reaction chamber said material

gas introduced into said reaction chamber at said first stage and a byproduct produced at said first stage, and

wherein said metal oxide film as an oxide of said specified

metal is formed on said semiconductor substrate, by repeating said

dual-stage deposition step two or more times.

4. Pertaining to claim 2, Matsuyama teaches the method according to claim 1, wherein said semiconductor substrate has a cylindrical trench on a surface

thereof in such a configuration that said metal film is formed

on a bottom and an inner side wall of said cylindrical trench.

5. Pertaining to claim 3, Matsuyama teaches the method according to claim 1, wherein said material gas and said byproduct produced at said first stage are removed

by introducing a gas different from said material gas at said first

stage into said reaction chamber at said second stage.

6. Pertaining to claim 4, Matsuyama teaches the method according to claim 1, wherein said material gas and said byproduct produced at said first stage are removed

by depressurizing said reaction chamber at said second stage.

7. Pertaining to claim 5, Matsuyama teaches the method according to claim 4, wherein after having performed said depressurizing at said second stage and before said first stages starts in a next dual-stage deposition step, a gas different from said material gas is introduced into said reaction chamber to thus recover a gas pressure before performing said depressurizing in said reaction chamber (the reasons are explained above in the rejection of claim 4) .

8. Pertaining to claim 6, Matsuyama teaches the method according to claim 1, wherein said metal oxide film having a finally required film thickness is formed by repeating said steps a plurality of number of times.

9. Pertaining to claim 7, Matsuyama teaches the method according to claim 1, wherein after said steps are repeated a plurality of number of times, said material gas is introduced continuously for a time longer than that required for said first stage, to form said metal oxide film having the finally required film thickness.

10. Pertaining to claim 8, Matsuyama teaches the method according to claim 1, wherein an oxidizing gas is introduced at said first stage.

11. Pertaining to claim 9, Matsuyama teaches the method according to claim 8, wherein introduction of said oxidizing gas is started from a second-time said steps.

12. Pertaining to claim 10, Matsuyama teaches the method according to claim 1, wherein said second stage comprises a process for introducing an oxidizing gas and a process for introducing said material gas and a gas different from said oxidizing gas.

13. Pertaining to claim 11, Matsuyama teaches the method according to claim 3, wherein said gas different from said material gas is an inactive gas.

14. Pertaining to claim 12, Matsuyama teaches the method according to claim 11, wherein said inactive gas is a nitrogen gas.

15. Pertaining to claim 13, Matsuyama teaches the method according to claim 1, wherein said metal film is made of metal having a catalytic action.

16. Pertaining to claim 14, Matsuyama teaches the method according to claim 1, wherein said vapor-phase growth method is a chemical vapor deposition method or a physical vapor deposition method.

17. Pertaining to claim 15, Matsuyama teaches the method according to claim 1, wherein said metal oxide film as said oxide of said specified metal is made of at least one selected from the group consisting essentially of

tantalum, hafnium, zirconium, and niobium.

18. Pertaining to claim 16, Matsuyama teaches the method according to claim 15, wherein tantalum penta-ethoxide is used as said material gas.

19. Pertaining to claim 17, Matsuyama teaches the method according to claim 8, wherein a said
oxidizing gas, a gas containing oxygen, ozone, water, nitrogen
oxide, or oxygen radical is used.

20. Pertaining to claim 19, Matsuyama teaches a method for manufacturing a semiconductor device having a capacitor, comprising:
a dual-stage deposition step comprising:
a first stage for introducing a material gas containing on oxide of a
desired metal into a reaction chamber in which a semiconductor
substrate on a surface of which a metal film is formed in part
or in entirety is placed to thus form an oxide film made of said
desired metal by a vapor-phase growth method and, after completion of the first stage, the following second stage for removing from said reaction chamber said material
gas introduced into said reaction chamber at said first stage and
a byproduct produced at said first stage, and
wherein said metal oxide film as an oxide of said specified

metal is formed on said semiconductor substrate, by repeating said dual-stage deposition step two or more times, thereby forming a capacitive insulating film to make up said capacitor; and forming an upper electrode to make up said capacitor on said capacitive insulating film.

21. Pertaining to claim 20, Matsuyama teaches the method according to claim 19, wherein said semiconductor substrate has a cylindrical trench on a surface thereof in such a configuration that said metal film is formed on a bottom and an inner side wall of said cylindrical trench.

22. Pertaining to claim 21, Matsuyama teaches the method according to claim 19, wherein said material gas and said byproduct produced at said first stage are removed by introducing a gas different from said material gas at said first stage into said reaction chamber at said second stage.

23. Pertaining to claim 22, Matsuyama teaches the method according to claim 19, wherein said material gas and said byproduct produced at said first stage are removed by depressurizing said reaction chamber at said second stage.

24. Pertaining to claim 23, Matsuyama teaches the method according to claim 22, wherein after having performed said depressurizing at said second stage and before said first stages starts in a next dual-stage deposition step, a gas

different from said material gas is introduced into said reaction chamber to thus recover a gas pressure before performing said depressurizing in said reaction chamber.

25. Pertaining to claim 24, Matsuyama teaches the method according to claim 19, wherein said metal oxide film having a finally required film thickness is formed by repeating said steps a plurality of number of times.

26. Pertaining to claim 25, Matsuyama teaches the method according to claim 19, wherein after said steps are repeated a plurality of number of times, said material gas is introduced continuously for a time longer than that required for said first stage, to form said metal oxide film having the finally required film thickness.

27. Pertaining to claim 26, Matsuyama teaches the method according to claim 19, wherein an oxidizing gas is introduced at said first stage.

28. Pertaining to claim 27, Matsuyama teaches the method according to claim 26, wherein introduction of said oxidizing gas is started from a second-time said steps.

29. Pertaining to claim 28, Matsuyama teaches the method according to claim 19, wherein said second stage comprises a process for introducing an oxidizing gas and

a process for introducing said material gas and a gas different

from said oxidizing gas.

30. Pertaining to claim 29, Matsuyama teaches the method according to claim 21, wherein said gas different from said material gas is an inactive gas.

31. Pertaining to claim 30, Matsuyama teaches the method according to claim 29, wherein said inactive gas is a nitrogen gas.

32. Pertaining to claim 31, Matsuyama teaches the method according to claim 19, wherein said metal film is made of metal having a catalytic action.

33. Pertaining to claim 32, Matsuyama teaches the method according to claim 19, wherein said

vapor-phase growth method is a chemical vapor deposition method

or a physical vapor deposition method.

34. Pertaining to claim 33, Matsuyama teaches the method according to claim 19, wherein said metal oxide film as said oxide of said specified metal is made of at

least one selected from the group consisting essentially of

tantalum, hafnium, zirconium, and niobium.

35. Pertaining to claim 34, Matsuyama teaches the method according to claim 33, wherein tantalum penta-ethoxide is used as said material gas.

36. Pertaining to claim 35, Matsuyama teaches the method according to claim 26, wherein as said
oxidizing gas, a gas containing oxygen, ozone, water, nitrogen
oxide, or oxygen radical is used.

37. Pertaining to claim 37, Matsuyama teaches a method for manufacturing a semiconductor device, comprising the steps of:
a first stage for introducing a material gas containing an oxide of a
desired metal into a reaction chamber in which a semiconductor
substrate on a right side of which a metal film is formed is placed
to thus form an oxide film made of said desired metal by a
vapor-phase growth method and, after completion of the first stage,
the following second stage for removing from said reaction chamber said material gas introduced into said reaction chamber at said first stage and a byproduct
produced at said first stage and, after completion of the second stage then introducing said material gas continuously for a lapse of time longer than said first stage,
thereby forming an oxide film made of said metal having a finally
required film thickness.

Claim Rejections - 35 USC § 103

38. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

39. Claims 18 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuyama et al., Japanese Patent Abstract Publication No. 2000-340559Japanese Patent Abstract Publication No. 2000-340559 in view of Roberts et al., U.S. Patent 6,461,914 B2.

40. Matsuyama discloses a semiconductor process substantially as claimed.

41. Pertaining to claims 18 and 36, Matsuyama fails to teach the method according to claims 13 and 31, wherein as said metal having a catalytic action, ruthenium or platinum is used. Roberts teaches a method wherein said metal having a catalytic action is ruthenium or platinum. In view of Roberts, it would have been obvious to one of ordinary skill in the art to incorporate the ruthenium or platinum of Roberts into the Matsuyama semiconductor process because the material can serve as both an oxidation layer and barrier layer (column 4, lines 16-29).

Conclusion

42. Please note that Japanese Patent Abstract Publication 2000-340559 is the same reference which was used for refusal of copending Japanese Application 2002-194006 and therefore Applicants should be aware of the prior art reference.

43. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

44. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

45. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

W. David Coleman
Primary Examiner
Art Unit 2823

WDC